Targeted Research Area: Injury

General Information on Injury

- **Prevalence and incidence of injury**:
  - Unintentional injuries claim the lives of more children each year than any other cause of death. At least one adolescent between ages 10 and 19 years dies of an injury every hour of every day. Injuries kill more adolescents than all diseases combined. Annually, 20-25% of all children sustain an injury sufficiently severe to require medical attention, missed school or bed rest.[53]
  - Fatal injuries accounted for 61.6% of deaths from age 1 through 19; in 1998, a total of 16,349 children aged 1 through 19 died from injuries.[54]
  - The true incidence of fatalities due to problems within the family is thought to be higher than the recorded 1,200 to 1,500 cases per year, with estimates ranging from 2,000 to 5,000 per year. Maltreatment of children causes an estimated 2,000 deaths annually in the US; 90% of these occur among children less than 5 years of age, making maltreatment the leading cause of injury fatality in this age group.
  - Each year in the U.S., 200,000 preschool and elementary school children visit the emergency department (ED) for injuries sustained on playground equipment (about 1 injury every 2.5 minutes).[55]

- **Mortality from Injury:** This information was not readily available to Lewin.

- **Disease severity/disease burden:** This information was not readily available to Lewin.

- **Cost to individual/family/society/healthcare system**: According to the Department of Transportation, in 1993, the economic costs of injury, disability, and death of children were well over $16B in the U.S. In a report by Miller et al. (2000), the estimated lifetime resource and productivity cost of unintentional injuries to children ages 0 to 19 in 1996 was $81B. The bulk of the financial burden associated with childhood unintentional injuries results from work losses experienced by injured children and their caregivers. Injury, vascular disease, and cancer account for similar proportions of medical spending, however, research funding in injury prevention is significantly less than for cancer (approximately 2.5% to 10.5%).[56]

- **Frequency/load of exposure:**
  - Reports of fatal child abuse and neglect as well as child homicide rates are rising. Very young children and adolescents are at highest risk for childhood injury, and

[53] Centers for Disease Control and Prevention, National Center for Injury Prevention and Control. *Facts on Adolescent Injury*. Available at http://www.cdc.gov/ncipc/factsheets/adoles.htm

[54] Stoddard FJ, Saxe G. Ten-year research review of physical injuries. Journal of the American Academy of Child and Adolescent Psychiatry 2001;40(10): 1128-1145.

[55] Centers for Disease Control and Prevention, National Center for Injury Prevention and Control. *Unintentional Injury Prevention.* Available at http://www.cdc.gov/ncipc/duip/duip.htm

[56] Miller TR, Romano EO, Spicer RS. The cost of childhood unintentional injuries and the value of prevention. The Future of Children 2000;10:137-163.

typically, sports, falls, motor-vehicle traffic injuries, and burns are the common causes.

- According to a 1995 General Accounting Office study described by Cummins et al., 14 million students attend schools and child care settings with substandard structural conditions; approximately one-third of schools need extensive repair or replacement. Low-income children are more likely to be exposed to structural hazards. Among poor children, African-American children are more likely to live in substandard housing conditions than are white children.

- **Special Populations:** This information was not readily available to Lewin.

Hypotheses 15 – 18, described on the following pages, are associated with the Injury targeted research area.

Hypothesis #15: Factors in the immediate environment surrounding children (e.g., instability in the home, household composition), can be major risk factors in the incidence of childhood injury.

General Information Related to Hypothesis #15

- **Findings from the recent research (targeted search):** Information reported in the following two studies contributed to the above-mentioned hypothesis.

Study #1: Stiffman MN, Schnitzer PG, Adam P, Kruse RL, Ewigman BG. Household composition and risk of fatal child maltreatment. Pediatrics 2002;109:615-621.

Study #1 hypothesis being tested: Household composition, i.e., people living in the child's household at the time of death and their relationships to the child, may be a risk factor for fatal child maltreatment.

Study #1 findings: Children residing in households with adults unrelated to them had the highest risk of maltreatment-related death. Children are at higher risk for maltreatment injury if residing in households with an unrelated adult, primarily an adult male. Two key risk factors are living with a stepfather or the mother's boyfriend. However, the reason children were more likely to die from maltreatment if an unrelated adult resided in the household is not clear; other household composition factors and risk factors are likely to combine to affect morbidity and mortality. The authors hypothesize that the presence of an unrelated adult in the home is a marker for instability in the household or that unrelated adults are not as keenly involved in protecting children from harm as are their biological parents.

Study #2: Stoddard FJ, Saxe G. Ten-year research review of physical injuries. Journal of the American Academy of Child and Adolescent Psychiatry 2001;40(10):1128-1145.

Study #2 hypothesis being tested: Children who are raised in chaotic and disorganized households may be at higher risk for physical and psychiatric injury from maltreatment that includes physical abuse, sexual abuse, and neglect. These children are likely to develop psychiatric problems resulting from self-blame or lack of trust in others.

Study #2 findings: This review of the past ten years of research (relevant to psychiatry) on injuries in children and adolescents reports that neglect accounts for more injuries and deaths than does physical abuse, although filings for both have increased steadily (660,000 in 1976 to 3.0 million in 1995). Studies have focused on specific populations with different types of neglect or abuse. Children in the age range of 1 to 5 years are at high risk for burn injuries, and according to Renz and Sherman (1993) and Yeoh et al (1994), injuries due to neglect or abuse range from 5.9% to 26% of pediatric burn admissions. Once injury occurs, children develop self-blame, lack of trust in others, and difficulty regulating affect. It is likely that disorganized and chaotic families lack the capacity to assist children in the physical and psychological recovery from injury. Family foster care, where neglect and abuse has been reported to occur, should also be assessed as potential settings for child maltreatment.

Hypothesis #16: Children who are exposed to physical and psychological stress due to large disruptions in their broader community/social environment, such as war, natural disasters (e.g., hurricanes, bombings, large-scale accidents such as crashes), and poverty may be at high risk for developing complex psychological problems (in addition to physical injuries) due to deaths in the family, home damage, and displacement.

General Information Related to Hypothesis #16

- **Findings from the recent research (targeted search):** Information reported in the following study contributed to the above-mentioned hypothesis.

Study #1: Stoddard FJ, Saxe G. Ten-year research review of physical injuries. Journal of the American Academy of Child and Adolescent Psychiatry 2001;40(10):1128-1145.

Study #1 hypothesis being tested: Children who reside in societies or communities exposed to problems such as poverty, damage from natural disasters, large accidents and wars, may be at high risk for injuries with adverse psychiatric outcomes.

Study #1 findings: Due to ongoing disruption in the child's social environment, children exposed to poverty, extreme environmental disruption, or wars develop PTSD. Furthermore, lack of community and individual help from parents or guardians during stressful periods precludes children from gaining access to appropriate medical attention or care when injury has occurred. Injuries sustained in large disasters or wars leads to more pervasive psychiatric responses due to inevitable and continuous disruption in the environment.

Hypothesis #17: As children grow and spend more time in the exterior environment, they are exposed to factors in the modern built environment that place them at risk for injury and death. The quality and structural safety of buildings, traffic, and play areas may affect the chance of incurring illness, disability, or injury. Poor construction and structural hazards may be leading causes for the prevalence of childhood falls, burnings, drownings, and secondary harms and diseases.

General Information Related to Hypothesis #17

- **Findings from the recent research (targeted search):** Information reported in the following two studies contributed to the above-mentioned hypothesis.

Study #1: Bartlett S. The problem of children's injuries in low-income countries: A review. Health Policy and Planning 2002;17:1-13.

Study #1 hypothesis being tested: Children in low-income communities and countries are at higher risk for unintentional injuries. Factors such as challenging living conditions, heavy traffic, lack of safe play space, and absence of child care options, which are prominent characteristics in low-income settings, may place children at high risk for preventable injury-related deaths.

Study #1 findings: Based on data from the WHO, UNICEF, and various other studies, injury rates for low-income countries are five times higher than those in higher-income countries. Children in poverty are more often victims of injuries due to risk factors in their surrounding built environment (e.g., poorly constructed playgrounds, overcrowded homes, unprotected machinery in homes). Children in low-income settings are more likely to be hospitalized due to burns, drownings, falls, traffic accidents, etc. According to this review, child injuries are considered a minor issue in low-income countries relative to the burden imposed by communicable disease and malnutrition, although they are the cause of death and disability for millions of children each year.

Study #2: Cummins SK, Jackson RJ. The built environment and children's health. Children's Environmental Health 2001;48:1241-1252.

Study #2 hypothesis being tested: The quality and design of a child's physical environment are associated with rates of injury and disability. Risk factors in the built environment surrounding children, such as poor-quality housing, poor traffic safety, and degradation of structures, may be associated with pediatric injuries.

Study #2 findings: Studies performed in inner-cities and studies on the structural condition of schools and child care settings conducted by the General Accounting Office showed that faulty construction or neglected maintenance places children at increased risk for falls, burns, and other injuries. The authors report that 40% of fall fatalities in 1991 occurred in children less than 5 years of age due to falls from buildings. In New York City, window barriers were a highly effective method of preventing toddler falls from windows. The authors highlight faulty construction or neglected maintenance as primary causes of structural hazards in homes and schools. Building defects are likely to increase the incidence of structural hazards and fires. Inadequate or deferred property maintenance, which is common in low-income properties, can also lead to structural damage, inadequate heating or lighting and electrical hazards. Exposures to overgrowth of mold, hazardous materials that contain lead or asbestos, infestation of rodents and insects, and poor air quality have been linked to asthma, injury from burns or falls, and carbon monoxide poisoning in children.

Hypothesis #18: Children may be at high risk for injury due to psychosocial factors in environments outside the home. Children who experience psychosocial stress in schools may be prone to aggressive or violent behavior, resulting in unintentional and/or intentional injury to oneself and others. School environments that exhibit high rates of psychosocial problems may also exhibit high rates of sports-related injuries among children and physical violence between children.

General Information Related to Hypothesis #18

- **Findings from the recent research (targeted search):** Information reported in the following study contributed to the above-mentioned hypothesis.

Study #1: Laflamme L, Menckel E. Pupil injury risks as a function of physical and psychosocial environmental problems experienced at school. Injury Prevention 2001;2:146-9.

Study #1 hypothesis being tested: Physical and psychosocial environmental problems experienced at school are associated with injury risk.

Study #1 findings: Among schools that were enrolled in the study conducted in Sweden, schools with psychosocial problems in the study had more than twice as many injuries due to violence than expected by chance, more injuries during sports activities, and more injuries of all kinds. Schools were categorized as having 'psychosocial problems' according to responses given to questionnaires about pupils' work environments. The schools reporting psychosocial problems had more injuries than by chance when considering sports related injuries (i.e., incurred during school gymnastics or sports), injuries due to physical violence (i.e., due to acts of physical violence between pupils), and all injuries aggregated. The study points to psychosocial problems that children encounter in the school environment as exacerbating factors for intentional or unintentional injuries among pupils.